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**G11B 27/034**

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**G5R RB784 RB789 RB81**

(56) Documents Cited

**GB 2295482 A EP 0613145 A2 EP 0590759 A1  
EP 0526064 A2 WO 94/11995 A1 WO 94/03897 A1  
US 5237648 A**

(58) Field of Search

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INT CL<sup>6</sup> G11B 27/00 27/02 27/022 27/024 27/026  
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(54) Cataloguing video information

(57) Pieces of video material are accessed by means of a first database storing edit decision lists containing time codes of edit points and information identifying the material. Using the first database, a piece of video material is accessed and using time codes of edit points shots within the material are selected and a frame from a shot is extracted and data reduced. The data reduced frame is stored in a second database with information derived from the first database to form a catalogue of the shots.

GB 2 312 078 A

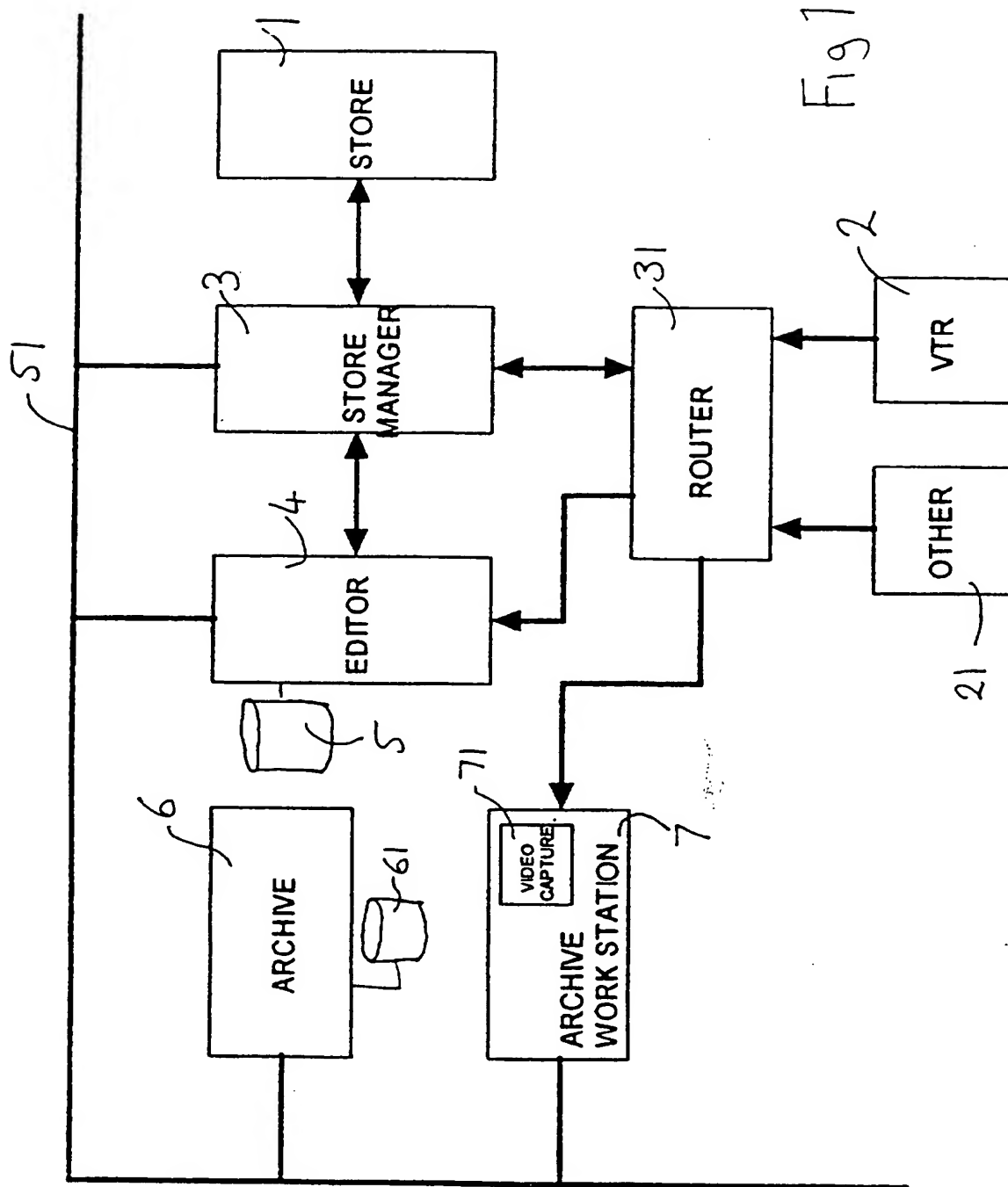
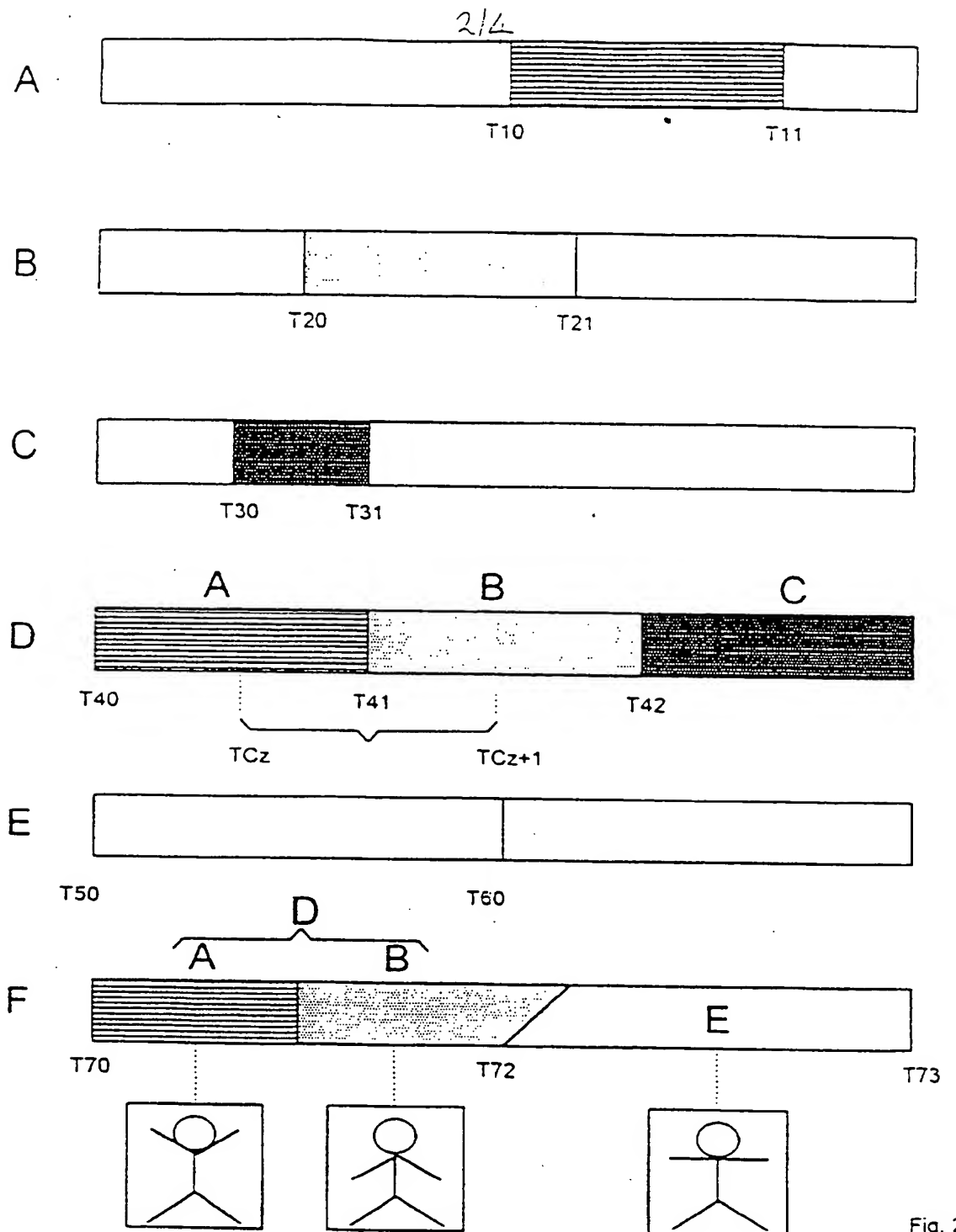


Fig 1



3/4

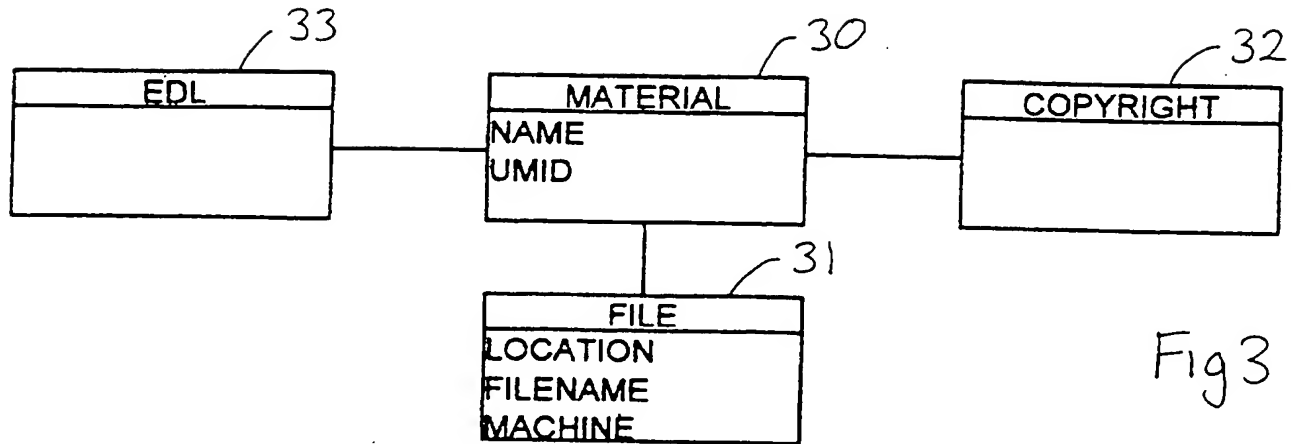


Fig 3

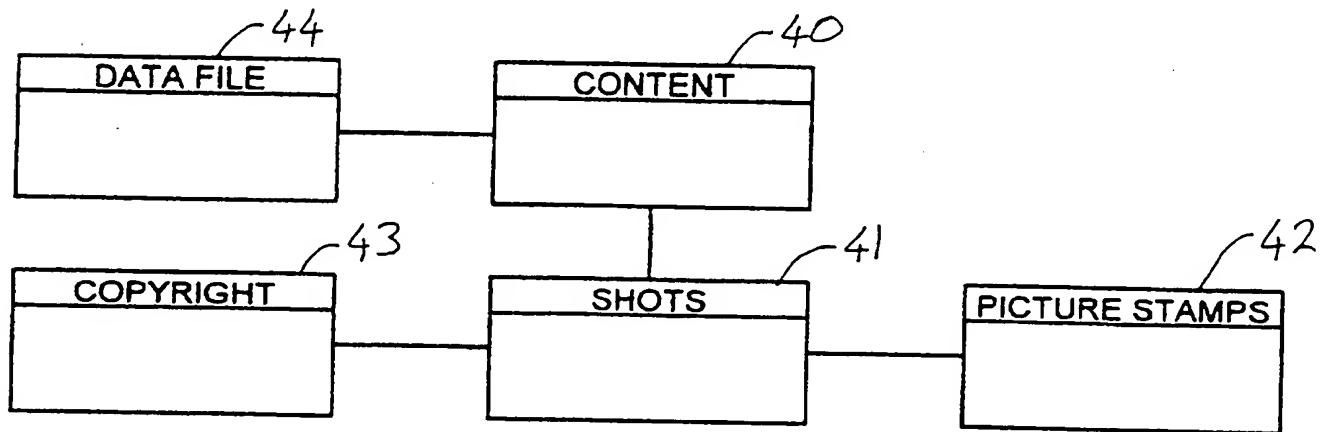


Fig 4

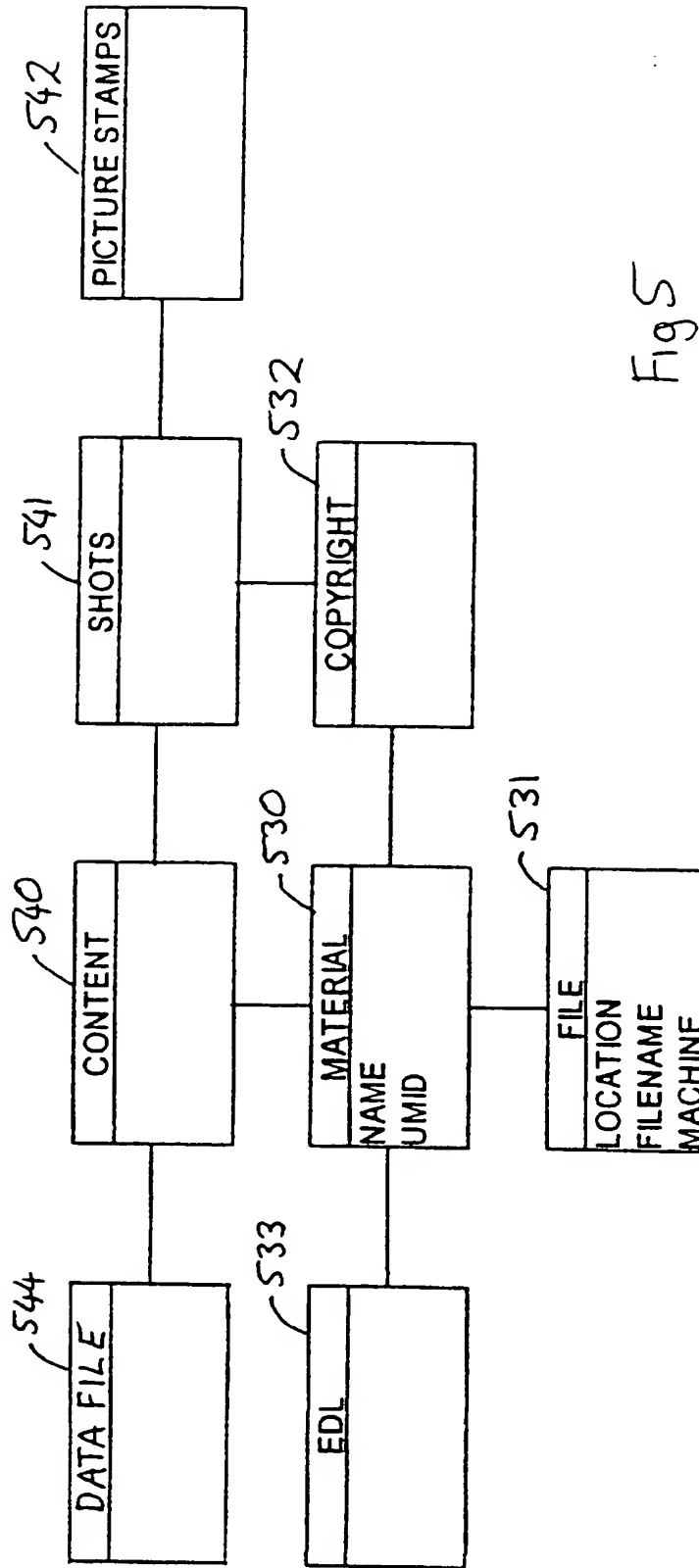


Fig 5

CATALOGUING VIDEO INFORMATION

5 The presentation invention relates to a system for cataloguing video information.

It has been proposed to store a catalogue of video information to enable a user to search and access desired information. Such a catalogue could be produced by an Archivist, who reviews all the video information and manually enters the catalogue data. However, such a task is time consuming and, if a large amount of data is to be archived would require a large number of people.

It is therefore desired to compile as much catalogue information as possible without initial review by an Archivist.

According to the present invention there is provided a system for producing a catalogue of video shots stored in a video store, comprising  
15 means including a relational database, the database having a first set of data in which edit decision lists identifying edited video material, time codes defining edit points setting boundaries of shots within the material and information identifying the shots within the material, are related, and a second set of data,

means for automatically accessing the edit decision lists deriving therefrom the  
20 time codes of shot boundaries and information identifying the shots, and for transferring the said information to the second set of data.

means for extracting from the video store frames from shots between derived pairs of shot boundaries, for data reducing the extracted frames and for transferring the extracted frames to the second set of data,

25 the second set of data relating the data reduced frames and the information identifying the shots from which the frames are taken.

Thus by making use of the edit decision lists which include time code and other information, shot boundaries can be automatically identified and a frame in a shot can be derived from the time codes of the shot boundaries without intervention by  
30 the Archivist. The derived frame is data reduced, e.g. by line and frame direction decimation in known manner for storage in the second dataset forming the catalogue.

The edit decision lists contain information identifying the shots and other associated information which is automatically transferred to the catalogue database.

For a better understanding of the present invention, reference will now be made by way of example to the accompanying drawings in which:

5 Figure 1 is a schematic diagram of a video signal processing system in which the present invention is practiced;

Figures 2A to F are schematic diagrams illustrating the production of edited video material;

10 Figure 3 is a simplified relationship diagram of an edit decision list database; and

Figure 4 is a simplified relationship diagram of an archive database; and

Figure 5 is a simplified relationship diagram of a database which is an alternative to the databases of Figures 3 and 4.

Referring to Figure 1 there is shown an Ethernet network 51 including:

15 a store server or manager 3 managing a video store 1, and, via a router 31, one or more VTRs 2 and other storage 21;

a video editor 4 having a relational database 5 of edit decision lists associated with it; and

20 an archive server 6 having an archive database 61 associated with it, and an archive workstation 7 including a video capture card 71.

The store manager 3 controls the writing of data to and the reading of data from the store 1, and via the router 31, to and from the VTRs 2 and other storage 21. Under the control of the store manager 3, video information is supplied to the editor 4 and to the archive workstation 7 when requested to do so by the editor 4 or  
25 workstation 7.

In the following description, the following terms are used:-

'Video Material' is a sequence of frames of video representing one or more shots. The material may be material as recorded by a cameraman or as subsequently edited;

30 A 'Shot' is a sequence of video frames recorded by a cameraman from the start of a recording interval to the end of that interval or a section of video between edit

points;

A 'Time Code' is a code identifying a frame within material in terms of [HH;MM;SS;FF] where HH,MM,SS,FF are two digit numbers representing Hours, Minutes, Seconds and Frames respectively. One frame represents 1/25 or 1/30 th of a second depending on frame rate; and

A 'Picture Stamp' is a data-reduced frame taken from a shot to represent or summarise the content of the shot or a section or view within the shot.

Pieces of video material are received from a variety of sources and stored in the store 1, VTRs 2 and/or the other storage 21. Each piece of material is given a Unique Material Identification code (UMID) by the storage manager 3. The video editor 4 accesses the stored material and produces edited material. The edited material may comprise unedited and/or previously edited material. Each piece of edited material is also stored in for example the store 1 and given a UMID.

Referring to Figure 3, the database 5 associated with the Editor 4 stores:

- a) the UMID and a name for the material and other information such as the name of the cameraman (block 30);
- b) data for locating the files where the material is stored. That data identifies: the store (1,2,21); the medium e.g. the identity of a particular tape; the filename; and the location on e.g. the tape (block 31);
- c) copyright information (block 32); and
- d) edit decision lists associated with the material (block 33).

The edit decision lists (EDL) will be explained in detail with respect to Figure 2. The EDL database 5 stores the EDL separately from the video material itself. Thus EDL can be produced and stored independently of the material. That can be done if for example the operator knows pieces of material sufficiently well to edit them without actually viewing the material.

Referring to Figure 4, the archive database 6 stores:-

- a) information identifying the content of pieces of video material (block 40), e.g. the name of the material;
- b) information identifying the shots in the material (block 41) that information



including the time codes of the boundaries of the shots;

c) picture stamps relating to the shots (block 42);

d) copyright information (block 43); and

e) data for locating the files where the video material is stored(block 44).

5 The relationship diagrams of Figures 3 and 4 are simplified for more clearly describing the present invention. Although not shown in those Figures, the material 30 or the content 40 may be stored in more than one file for ease of access for different purposes. Content 40 has one or more shots and each shot could have more than one picture stamp. Other variations will be apparent to the skilled person.

10 Referring to Figure 2, A to F represent UMIDs of the material schematically shown on the right of each UMID. Each piece of material has a title and copyright data associated with it.

D is a piece of edited material derived from pieces of material A, B and C. The edit points are the boundaries between the sections and have time codes TCx eg 15 T10 associated therewith.

An edit decision list for D would be for example:

EDL/D	UMI	Source TC	Destination TC
D			
0001	A	T10 T11	T40 T41
20 0002	B	T20 T21	T41 T42
0003	C	T30 T31	T42 T43

E illustrates by way of example a further piece of video material.

F illustrates edited material formed from D and E where an edit decision list for F 25 may be:

EDL/D	UMI	Source TC	Destination TC
	D		
0001	D	T40 T42	T70 T72
0002	E	T50 T60	T72 T73

As shown, F is made up of parts of A and B and E.

For simplicity of explanation, it has been assumed that the parts A and B of F are identical to parts A and B of D. However, F could comprise subsections of A and B of D, defined by appropriate IN and OUT time codes TCz and TCz+1.

EDL/D	UMI	Source TC	Destination TC
	D		
0001	D	TCz TCz+1	T70 T72
0002	E	T50 T60	T72 T73

The edit points may be cuts as shown at eg T70 and/or cross-fades as shown at eg T72, as known in the art.

For the purpose of archiving in accordance with the present invention, it is assumed that the time codes of edit points indicate significant changes of scene and therefore beginnings and ends of sections or shots within the material.

In accordance with the invention the catalogue information forming the archive includes a picture stamp which is a reduced size digital image intended to be representative of the subject matter of the section of material from which it is taken. The picture stamp may be taken from any one or more points  $[TCx + TCx+1]/n$  in a section of material. TCx and TCx+1 are time codes of edit points. Preferably it is taken from a point  $[TCx + TCx+1]/2$  in the section of material, because the beginnings and ends of shots may sometimes include matter such as blanked video, or colour bars, which is irrelevant to archiving.

For this purpose an archive workstation 8 has a digital video capture board 81

including circuitry for decimating the selected frame in the line and frame directions to produce the picture stamp. Video capture boards and decimating circuits for producing data reduced images are known in the art and need no further description.

Information associated with the picture stamps is derived from the EDL database and put into the archive data base using a recursive program an example of which is:

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Recursive generation of catalogue information
PROCEDURE Build_Catalogue_List( Mat_ID1, in_TC, out_TC )
IF ( Mat_ID1 between in_TC and out_TC has an EDL )
10   FOR ( each edit material, Mat_IDn within in_TC and out_TC of EDL )
      CALL Build_Catalogue_Lists( Mat_IDn , MAT_IDn_in_TC,
MAT_IDn_out_TC )
      END FOR
ELSE
15   Print Copyright
      Print in_TC
      Print out_TC
      Print name
      END IF
20
END PROCEDURE

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In this program 'print' has the effect of transferring the data associated with 'print' into the appropriate field in archive data base.

25 For each associated pair of in\_Tc and out\_TC (i.e. in Time Code and out Time Code), the location of the picture stamp is calculated as eg  $(in\_TC + out\_TC)/2$ . Picture stamps taken from the section of material between edit points are put into the archive data base, associated with the other information.

30 It will be appreciated that the accessing of the EDL database and the extraction of the picture stamps and archive data requires no manual intervention, the archiving

proceeding automatically when, for example, material is edited.

The archived data may be reviewed by an Archivist and edited manually if, for example, the Archivist considers that the automatic archiving has not properly represented the archived material.

5           Although the invention has been described hereinabove as having two relational databases 5 and 61 included in respective processors, the two databases may be replaced by one relational database in one processor and having two sets of data. Figure 5, for example shows one illustrative simplified example of such a single database having a first set of related data (531 to 533) corresponding to the data set of  
10           Figure 3 and a second set of related data (540 to 542 and 544) corresponding to data set 40 to 42 and 44 of Figure 4 and also related to the copyright data 532.

          It will be appreciated that other information may well be included in the sets of related data. That other information is within the choice of the system designer. It may include, by way of example, scripts associated with the shots and/or audio data  
15           associated with the shots.

CLAIMS

1. A system for producing a catalogue of video shots stored in a video store, comprising

5 means including a relational database, the database having a first set of data in which edit decision lists identifying edited video material, time codes defining edit points setting boundaries of shots within the material and information identifying the shots within the material, are related, and a second set of data,

10 means for automatically accessing the edit decision lists deriving therefrom the time codes of shot boundaries and information identifying the shots, and for transferring the said information to the second set of data, and

means for extracting from the video store frames from shots between derived pairs of shot boundaries, for data reducing the extracted frames and for transferring the extracted frames to the second set of data,

15 the second set of data relating the data reduced frames and the information identifying the shots from which the frames are taken.

2. A system according to claim 1, wherein the extracting means selects a frame from a shot between edit points, by selecting a predetermined position between the said edit points.

3. A system according to claim 2 wherein the selected frame is selected according to  $(TCx + TCx+1)/n$  wherein  $TCx$  and  $TCx+1$  are time codes of successive edit points.

25 4. A system according to claim 3, wherein  $n = 2$ .

5. A system according to claim 2 3 or 4, wherein the extracting means further comprises means for decimating the selected frame in the line and frame directions to form a reduced size image.

6. A system according to any preceding claims comprising a first relational database having the first set of data and a second relational database having the second set of data.

5 7. A system according to claim 7, wherein the first and second relational databases are included in respective processors.

10 8. A system for producing a catalogue of sequences of video information substantially as hereinbefore described with reference to Figures 1 to 4 of or Figures 1 to 3 and 5 of the accompanying drawings.



Application No: GB 9607691.4  
Claims searched: 1 to 7

Examiner: Peter Easterfield  
Date of search: 4 July 1996

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): G5R (RB81)

Int Cl (Ed.6): G11B 27/00, 27/02, 27/022, 27/024, 27/026, 27/028, 27/029, 27/031,  
27/032, 27/034, 27/036, 27/10

Other: Online: WPI, JAPIO, CLAIMS

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X,E	GB 2295482 A (LIGHTWORKS)	1 at least
X	EP 0613145 A2 (SONY)	1 at least
X	EP 0590759 A1 (IBM)	1 at least
X	EP 0526064 A2 (GRASS VALLEY)	1 at least
X	US 5237648 A (APPLE)	1 at least
X	WO 94/11995 A1 (DUBNER)	1 at least
X	WO 94/03897 A1 (VIDEO FUSION)	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.